

Geogenic Groundwater Contamination: A Case Study Of Canakkale - Western Turkey

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Study area is located NW of Turkey. Total area of the drainage basin is 465 square kilometers and mostly covered by volcanic rocks. Majority of these rocks have highly altered and lost their primary properties because of alteration processes. Especially argillic alteration is common. Tectonic movements and cooling fractures were created suitable circulation environment of groundwater in the rocks (secondary porosity). Alteration affects the composition of groundwater and some rock elements pass into groundwater during the movement of water in the cavities of rocks.

High concentration of natural contaminants related to water-rock interaction in spring water has been studied in this research. Field measurements such as pH, electrical conductivity, temperature, oxidation-reduction potential and salinity carried out in 500 water points (spring, drilling, well and stream). 150 water samples taken from the water points and 50 rock samples taken from the source of springs has been investigated in point of major anion-cations, heavy metals and trace elements. Some components in the water such as pH (3.5-9.1), specific electrical conductivity (84-6400 microS/cm), aluminum (27-44902 ppb), iron (10-8048 ppb), manganese (0.13-8740 ppb), nickel (0.2-627 ppb), lead (0.1-42.5 ppb) and sulphate (10 to 1940 ppm) extremely high or low in the springs sourced from especially highly altered Miocene aged volcanic rocks. Some measured parameters highly above according to European Communities Drinking Water Regulations (2007) and TS266 (2015-Intended for Human Consumption Water Regulations of Turkey) drinking water standards.

The most common element which is found in the groundwater is aluminum that is higher than to the drinking water standards (200 microg/L). The highest levels of the Al values measured in acidic waters with very low pH (3.4) emerging from altered volcanic rocks because of acid mine drainage in Obakoy district, north of the study area. The abundance of this element in some water sources is believed to be closely associated with the alteration of feldspar minerals in the andesite and basalts of the Middle Eocene Sahinli Formation.

Various studies related to topic show that consumption of these water containing high aluminum, iron, manganese, nickel and lead for drinking purposes cause serious health problems (Alzheimer's, Parkinson's, physical and mental development disorders in children, various cancers, stomach - intestinal disorders and skin diseases). This situation limits the usable groundwater potential and causes potable water scarcity in the region. Consequently, while using of these groundwater resources in the region, taking several precautions are necessary and doing new water resource explorations are recommended.

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